

A framework for national climate change risk and adaptation assessment across multiple sectors

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INTRODUCTION

Climate change is one of the major threats of the 21st Century both nationally and globally. Addressing this threat requires an integrated response that links climate change mitigation, adaptation and other socio-economic objectives.

The UK Climate change Act (2008) mandates the UK government to undertake a Climate Change Risk Assessment (CCRA) every five years to identify priority climate risks. This provides the evidence base to inform Government-led National Adaptation Programmes. However, while the science base underpinning the CCRA has progressed, the process has lacked a consistent platform for assimilating scientific knowledge, across sectors. The focus has instead been on the sectoral analysis of evidence, with subsequent synthesis and integration being led by experts.

THE OPENCLIM PROJECT

The OpenCLIM (Open CLimate IMpacts modelling framework) project has developed an integrated framework for future risk assessments. The framework links detailed climate and socio-economic scenarios with spatially explicit, state-of-the-art risk and adaptation models across multiple sectors. It provides consistent and spatially explicit results for the UK at 2 and 4°C global warming levels, by 2050 and 2100, related to the UK Shared Socioeconomic Pathways (UK-SSPs). It embeds the best available science alongside internal consistency in the assumptions applied across sectors.

Through this novel framework, OpenCLIM demonstrates progress related to (1) integrated model framework design; (2) coupling individual models into a set of new logical workflows; and (3) the expression of adaptation in the risk models.

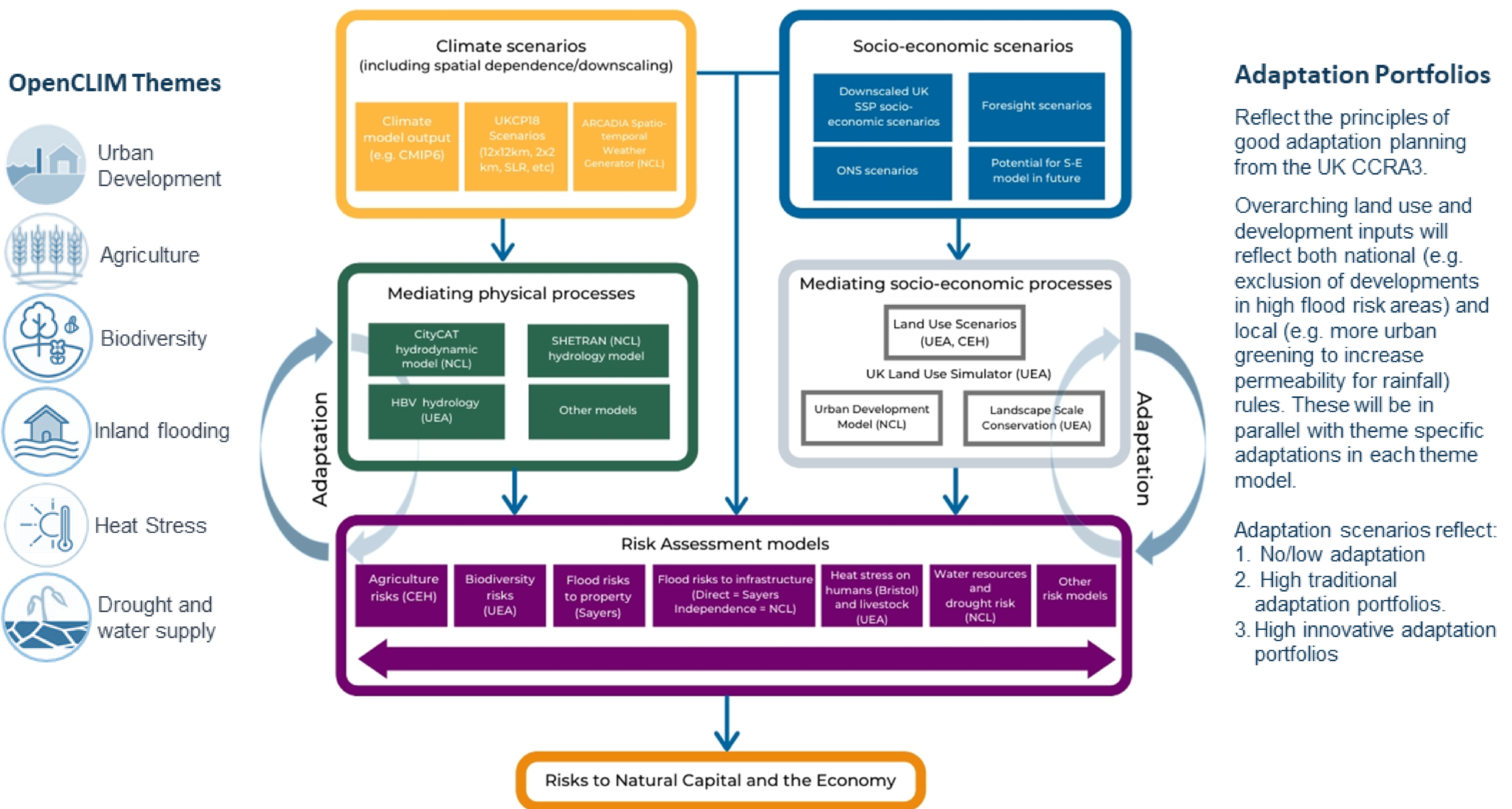


Figure: The OpenCLIM structure, themes the framework is being demonstrated for, and adaptation scenarios

EMBEDDING ADAPTATION IN THE RISK FRAMEWORK

In the OpenCLIM framework urban development and land use changes are key to exploring changes in vulnerability and exposure. Land-use and development scenarios interact with most of the theme workflows to allow socio-economic change to be mapped alongside climate change. As the models are spatially consistent, shared elements can be modelled consistently across the themes and associated climate risks. For example, land cover changes and nature-based adaptation options. These land cover and urban development changes are considered alongside more traditional sector specific adaptation actions, such as building retrofit to reduce overheating risk or flood defences. These options underpin a set of embedded and consistent adaptation scenarios.

OpenCLIM OUTPUTS AND LEGACY

The OpenCLIM project has been developing a community around the open, innovative and flexible integrated framework. To ensure long-term sustainability, beyond the end of OpenCLIM in March 2023, model code and outputs are hosted on the DAFNI (Data & Analytics Facility for National Infrastructure) platform. This facilitates ongoing testing and sharing of model code. Beyond March 2023, new models and workflows can be added as science and user needs develop, supporting scientific insights for the CCRA4 and the National Adaptation Programme. Results will be available to academic and non-academic end-users via an OpenCLIM database, archived and made available nationally, to the devolved administrations (England, Wales, Scotland, Northern Ireland) and other potential users.